CNO and Secretary of the Navy Environmental Awards

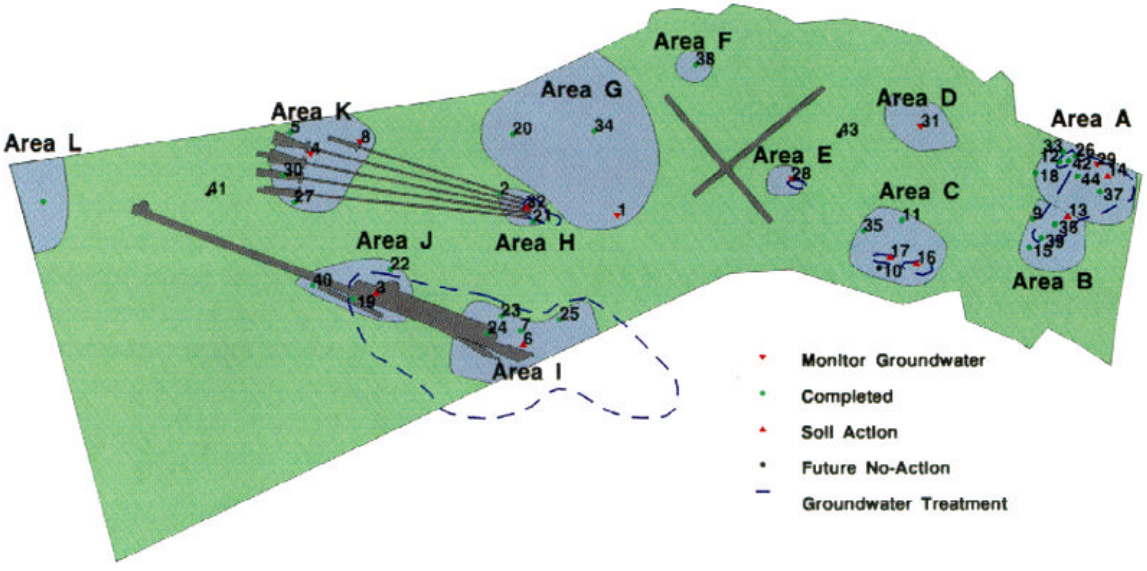
Environmental Cleanup: Installation

Introduction

The Naval Air Engineering Station (NAVAIRENGSTA) is the Shore Station Management component of the Naval Air Warfare Center Aircraft Division Lakehurst. Collectively known as Navy Lakehurst, the organization's mission is Aircraft Platform Interface, which is the safe effective operation of aircraft to, from, and on all aviation platforms. To accomplish this mission, Navy Lakehurst currently employs over 1900 civilian employees, consisting primarily of engineers, technicians, logisticians, acquisition experts and manufacturing support specialists. In addition, Navy Lakehurst has approximately 230 military personnel. The Station encompasses 7430 acres and contains 446 structures and 328 buildings. Facilities include two 5,000-foot operational runways, a 12,000-foot runway equipped with catapult and arresting gear, and five test tracks.

The Station and the surrounding area are located within the Pinelands National Reserve, the most extensive undeveloped land tract of the Middle Atlantic Seaboard. The Pinelands consist of a delicately balanced ecosystem that covers the largest drinking water aquifer in the Northeast. Subsequently, the Station's groundwater is subjected to the strictest cleanup levels in the region.

Named to the National Priorities List (NPL) in 1987 with 45 individual sites, the Station's goal has been the swift removal from this list. To date we have completed final or interim Records of Decision (ROD) for all our sites. EPA Region II has allowed us to expedite the **delisting process**.



We expect to include "construction complete" language in our last ROD which covers Areas I & J Natural Attenuation, which is scheduled to be signed in September 1999.

Background

The high water table and sandy soils at Lakehurst allow contaminants to infiltrate to groundwater easily and move swiftly. Therefore, the first priority of the Station's cleanup program was to prevent the flow of contamination to off-base streams. We proceeded in installing pump and treat systems at four areas of known groundwater contamination between 1991 and 1993. The next priority was addressing soil contamination, especially the "hot spots" which were contributing to existing groundwater problems. Through interim removal actions, the Station excavated many tons of contaminated soil, most of which was recycled into road base material. Now that all our soil sites are completed, the Station's remaining challenge is to refine the operation of the pump and treat facilities and where feasible, find alternative methods to remediate groundwater which are less expensive and rely on less chemical addition and electricity. Groundwater modeling capability has been developed in-house to enable our engineers to determine how best to capture contamination in the shortest time possible. Last year the pump and treat systems were modified based on the models developed. This year various treatment technologies were added to supplement the groundwater cleanup at Site 28, Area A, Area D and Area K. In FY98, installation of a sparge/vapor extraction system helped reduce groundwater contamination levels to the extent that the *regulators allowed us to temporarily turn off the associated pump and treat facility.*

Innovative Technology Demonstration/ Validation and Implementation

Natural Attenuation Study

In FY 98, NAVAIRENGSTA completed a three-year study to verify the existence and evaluate the effectiveness of natural restoration processes in degrading the VOC plume in Areas I & J. The results of the first year of the study indicated that intrinsic bioremediation is an active process within the plume. Computer models of the site were calibrated using calculated and observed contaminant levels. The study has determined that both aerobic and anaerobic processes are taking place in various parts of the plume. This study will be the basis for the site's Proposed Plan in FY99. If natural attenuation is retained as the site remedy, the Navy expects to save over $40 million over the life of the project and protect over 80 acres of wetlands.

Solar Powered Spray Irrigation Treatment Systems

In FY97 we experimented with pilot scale solar powered remediation systems. In FY98 we added additional spray irrigation systems. These systems are placed in 2 areas designated for long term monitoring. In order to reduce cleanup timeframes and subsequently long term monitoring costs, wells with the highest levels of volatile organic compounds (VOCs) were selected for this inexpensive pumping technique. There are currently 4 pumps in Area K which collectively pump 15 gallons per minute and in Area D, 2 pumps collectively pump 7 gallons per minute. These pumps are in operation 7-8 months a year. Although the pumps are in use only in temperate months and during sunny periods, the cost of running these systems is essentially zero. Initial testing results indicate an average 90% reduction of VOCs after spraying. Due to low levels of volatiles in the groundwater, air discharge permits were not required by the state.

Sparge Wall at Area A

The Station installed a sparge wall at the downgradient edge of the Areas A/B plume in FY 98. This sparge wall was put in place to supplement the pump and treat system in the area and acts as a barrier and remediation system for groundwater as it flows toward our northern base boundary. As levels of contamination decrease over time, it is the Station's wish to shut off the pump and treat system and utilize the sparge wall as the sole remediation system. This would result in approximately $140K savings yearly in operations and maintenance. Over the next 10 years of expected remediation, this could save the Navy and the taxpayers approximately $1.4M. The sparge wall also does not carry with it the same chemical use and iron removal aspects of operation, limiting impact to the environment.

Vapor Extraction (VE)/Sparge System At Site 28

In FY98 we installed a combination vapor extraction/sparge system to address a remaining "hot spot" of groundwater contamination at Site 28. Shortly after startup, contamination levels decreased in the area and the Station negotiated with the State and EPA to shut off the pump and treat facility for a period of six months. At the end of the six months, the technical review committee would review the groundwater data to decide if the turn-off could be permanent. The VE/sparge system was installed for $95K and costs $14K/year to operate. In comparison, the pump & treat system costs $159,000 to run, plus associated electric costs. Therefore, the VE/sparge system will pay for itself in less than one year of operation.

Free Product Capture Trench

To increase the flow rate and free product capture in an existing dual phase recovery well at Site 16, the environmental branch teamed up with the NJDEP to install a capture trench. Since the water table is relatively shallow at the area (4 ft), trenches were dug on both side of the well, extending 50 feet. The trenches were quickly lined with filter fabric to keep out the dirt and then filled with pea gravel. By diverting water and product toward the recovery well, the trenches have increased well yield by 30 gallons/minute. This project was completed in one day using in-house labor and heavy equipment.

Partnerships

Our partnership with NAWC Trenton continued in FY98 to aid them in the BRAC process. The engineers at Lakehurst assisted by writing decision documents and presenting plans at public meetings for 6 of their 9 cleanup sites. Lakehurst also assisted Trenton by writing their Declarations of Environmental Restrictions for parcels scheduled for re-use. On October 15, 1998, NAWC Trenton was officially closed in a ceremony chaired by RADM Dyer.

Restoration Advisory Boards

The Restoration Advisory Board for NAES has developed as a public forum to discuss any environmental concern raised by the community. Although interest in the Station's restoration process has been minimal for the last three years, the RAB is a great way for the public to learn more about environmental controversies in our area from the environmental experts at NAES. In FY98, the results of a US Geological Survey study of radium levels in Ocean and Atlantic Counties' groundwater were released. The USGS study revealed no indications of a source of the wide spread contamination, and natural causes are being explored. The RAB meetings provided a way to disseminate the information and explain the testing results to the public.

Opportunities for Small and Small Disadvantaged Businesses

In FY98, 65% of our contracted Installation Restoration work went to small or small disadvantaged businesses. Our largest treatment system operations and maintenance (O&M) contract covers the groundwater treatment systems. This contract is with an 8-a program company, Aquilar & Associates. In FY98, the Station initiated another small disadvantaged business contract for environmental cleanup. Matrix Environmental and Geotechnical Services, Inc. was awarded a contract for O&M of 5 air injection and extraction treatment systems. Matrix is a New Jersey based women-owned, 8-A business and this is their first DoD facilities maintenance contract.

Reducing Risk to Human Health and the Environment

Interim Actions

In FY98 the Station installed and tested: solar spray irrigation systems, a vapor extraction/sparge system, a sparge wall, and a free product capture trench. In addition, we concluded a three-year natural attenuation study. All these systems will expedite the remediation of groundwater. Wherever possible, the Station is aiming to substitute low cost, in-situ technologies where conventional groundwater recovery and treatment is taking place. The 3 year study of Areas I & J (our largest TCE plume) verified natural attenuation as a viable and present remediation technique for Lakehurst. The results of this study may help the Station and its neighbors (Fort Dix and McGuire AFB) convince regulators to use this approach at similar plumes.

Improvements in Site Management

To enhance site management, the Station now receives the monthly groundwater data for its pump and treat systems electronically. This data is transferred directly from the laboratory to our geographic information system (GIS) in the state-required format. This has reduced transcription errors and allows faster transmittal. In the past we used a consultant to write the data interpretation reports for the groundwater sites. Now we perform this interpretation in-house, manipulating the data in the GIS to generate Earthvisions™ three-dimensional models of the groundwater plumes. The Station saves approximately $100k a year in data interpretation and can ensure on-time delivery of these reports to the regulators. We are also using the GIS to delineate our groundwater classification exemption areas (CEAs). These are areas where groundwater does not meet the state water quality criteria. These CEAs are being established as one of the steps needed by the State prior to delisting the Station from the NPL.

Improvements in Site Characterization Techniques

In FY98 the Station continued work with the US Army Corp of Engineers, Waterways Experiment Station to convert our existing groundwater models into the DoD Groundwater Modeling System (GMS). The GMS is a package of many groundwater models and visualization tools. By converting to GMS, the station can share data readily with other DoD activities, such as merging our model with Ft. Dix (which is contiguous to Lakehurst); and allows us to utilize the latest groundwater models to run transport scenarios of multiple contaminants simultaneously, instead of having to run dozens of simulations to achieve the same result.

Summary

Navy Lakehurst's goal of delisting from the NPL is becoming a reality. However, we also realize that groundwater cleanup can take decades and we are continuing to experiment with low-cost methods to expedite the process. In FY99 we will become a test site for co-metabolism of chlorinated solvents under the DOD Small Business Innovative Research program.